SYNOPSIS

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OF

THE THESIS TO BE SUBMITTED

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SECTION-I

INTRODUCTION

Heterocyclic compounds are of particular interest in medicinal chemistry and this has catalyzed the discovery and development of much new heterocyclic chemistry and methods. The chemistry of heterocyclic compounds is one of the most complex branches of organic chemistry. Synthetic heterocyclic chemistry has influenced almost every place of human life and the compounds have found their application in diverse field like pharmaceutical, agricultural, polymer, dyes and various industries.

Compounds now classified as mesoionic have been known for more than a century.[1] Since that time both the concept of mesoionic compounds and methods for synthesizing them have undergone extensive changes and modifications. Following an important paper by Schonberg,[1] Baker and Ollis,[3] Ollis and Ramsden[4] and Potts[5] put forward broadly similar definitions of mesoionic compounds.

Mesoionic compounds are a class of five membered ring heterocycles (and their benzo derivatives) which possess a sextet of electrons in association with the atoms composing the ring but which cannot be represented satisfactorily by any one covalent or polar structure.[6] The lactone, which is a 1,2,3-oxadiazole-5-one heterocycle was named as sydnone in honour of University of Sydney (Sydney + lactone) where it was prepared for the first time by Earl and Mackney in 1935.[7] The most important member of the mesoionic category of compounds is the sydnone ring system. Sydnone is dipolar, pseudo-aromatic heterocycles with a unique variation in electron density around the ring. Baker and Ollis introduced sydnone in 1949.[8] The IUPAC name of sydnone is 1,2,3-oxadiazolium-5-olates.

The sydnone ring bears a fractional positive charge balanced by a corresponding negative charge located on a covalently attached oxygen.[4] Due to the unique structure; sydnone possesses both the conjugated and polar character, which makes it sensitive to both electric and magnetic fields.

Sydnone is a typical mesoionic compound and its chemical properties are unique. Sydnone compounds seem to be fairly different from other aromatic compounds in both reactivity and stability.[9]

A hydrogen atom at the 4th position of the sydnone ring allows substitution with a wide variety of electrophiles, such as bromination,[10] nitration,[11] acylation[12] and sulfonation.[13] It seems to be possible to substitute the 4th-position by electron releasing groups such as methylene group by Mannich reaction.[14]

A large number of sydnone derivatives have been synthesized as they serve to be vital biological agents *viz*, antibacterial, antifungal,[15,16] antitumor,[17] antioxidant activity,[18] anticancer,[19] anti-inflammatory, analgesic, antiviral[20-22] activities.

Benzothiazoles are a large family of compounds and their chemical structure containing a benzene ring fused with a thiazole ring is rather stable and is quite recalcitrant towards microorganisms and direct photolysis.

Benzimidazoles are remarkably effective compounds both with respect to their bacteria inhibitory activity and their favorable selectivity ratio. Extensive biochemical and pharmacological studies have confirmed that these molecules are effective against various strains of microorganisms.

Sulfonamide is the basis of several groups of drugs. The original antibacterial sulfonamides (sulfa drugs) are synthetic antimicrobial agents that contain the sulfonamide group.

Mannich Reaction is employed in the organic synthesis of natural compounds such as peptides, nucleotides, antibiotics and alkaloids (e.g. tropinone). This reaction is also utilized in agro chemicals (e.g. plant growth regulators), paint and polymer chemistry, catalysts and crosslinking. Mannich reaction is also used in the synthesis of medicinal compounds e.g. rolitetracycline (Mannich base of tetracycline), fluoxetine (antidepressant), tramadol and tolmetin (anti-inflammatory drug).

SECTION-II

EXPERIMENTAL

SCHEME-I: 3-(4-methoxyphenyl)-4-(*N*-(substituted phenyl)sulfamoyl)-sydnone

The title compounds were prepared via several steps such as condensation, nitrosation, cyclisation, chlorosulfonation etc.

3-(4-methoxy phenyl) sydnone was prepared by standard method, which was sulphonated with chloro sulphonic acid in presence of phosphorus pentoxide to give 4-(chlorosulfonyl)-3-(4-methoxyphenyl)-sydnone, which was treated with various 1º-amines to obtain title compounds.

SCHEME-II: 3-(4-methoxyphenyl)-4-(*N*-(substitutedbenzo[*d*]thiazol-2-yl)sulfamoyl)-sydnone

The title compounds were obtained by taking 4-(chlorosulfonyl)-3-(4-methoxyphenyl)-sydnone derivative condense with substitutedbenzo[*d*]thiazol-2-amine.

SCHEME-III: 3-(4-methoxyphenyl)-4-((2-substituted-1*H*-benzo[*d*]imidazol-1-yl)sulfonyl)-sydnone

In this scheme 4-(chlorosulfonyl)-3-(4-methoxyphenyl)-sydnone react with 2-substituted-1*H*-benzo[*d*]imidazole to obtain title compounds.

SCHEME-IV: 3-(4-methoxyphenyl)-4-(((substitutedphenyl)amino)methyl)-sydnone

This part deals with Mannich reaction, which was performed using 3-(4-methoxy phenyl) sydnone, formaldehyde and various 1º-amine to obtain derivative described in scheme-IV

SCHEME-V: 4-(((substitutedbenzo[*d*]thiazol-2-yl)amino)methyl)-3-(4-methoxyphenyl)-sydnone

The title compounds were obtained by taking 4-(chlorosulfonyl)-3-(4-methoxyphenyl)-sydnone and paraformaldehyde condense with substituted benzo[*d*]thiazol-2-amine.

SCHEME-VI: 3-(4-methoxyphenyl)-4-((2-substituted-1*H*-benzo[*d*]imidazol-1-yl)methyl)-sydnone

In this scheme 4-(chlorosulfonyl)-3-(4-methoxyphenyl)-sydnone and paraformaldehyde condense with 2-substituted-1*H*-benzo[*d*]imidazole to afforded title compounds.

SECTION-III

CHARACTERIZATION

All the synthesized compounds of each class were characterized by thin layer chromatography, elemental analysis, infrared spectroscopy and some of the representatives by nuclear magnetic resonance spectroscopy.

SECTION IV

BIOLOGICAL RESULTS

All the synthesized compounds have been evaluated for their *in vitro* biological assay like antibacterial activity towards gram positive bacteria and gram negative bacteria and antifungal activity. The biological activities of the synthesized compounds have been compared with standard drugs.

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